#3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	**Alex Ruan** **Christopher L. Rutledge**		
Serial No.	**09/820,513**	Examiner:	**TO BE ASSIGNED**
Filing Date:	**March 29,2001**		
Title:	**Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect Architecture and Dense Wavelength Division Multiplexing**	Group Art Unit:	**TO BE ASSIGNED**

Assistant Commissioner for Patents
Washington, D.C. 20231

PETITION FOR FILING BY ASSIGNEE under 37C.F.R. 1.47(b)

Dear Sir:

Applicant, Lucent Technologies Inc., petitions the Commissioner to accept the filing of the above-identified U.S. Patent application by it, as the party to which the invention disclosed and claimed in said Patent Application rightfully belongs, on behalf of and as agent for the inventor.

A declaration and copies of documentation are attached hereto providing proof of the pertinent facts concerning the refusal of the inventors to join in the present application for patent and establishing that Lucent Technologies Inc. has a sufficient proprietary interest in this matter to make application on behalf of and as agent for the inventor and showing that such action is necessary to preserve the rights of the parties.

The undersigned hereby verifies that all said copies of said documentation are true copies.

The name and address of the inventors refusing to join in this application are as follows:

Alex Ruan
5330 Lexington Woods Lane
Alphareta, GA 30005

Christopher L. Rutledge
39 Suydam Road
Somerset, NJ 08873

The invention was developed under the authorization of Lucent Technologies Inc., (hereinafter "Lucent") by Alex Ruan and Christopher Rutledge, each believed to be presently residing at the above addresses, who were employed by Lucent to do so.

Upon information and belief, based on precedent which will be discussed below, Lucent is entitled to clear title to the invention and to the above identified patent application and any patent which issues thereon.

The Supreme Court of the United states in *Solomon v. United States,* 137 U.S. 342, 346 (1890), held:

> If one is employed to devise or perfect an instrument, or a means for accomplishing a prescribed result, he cannot, after successfully accomplishing the work for which he was employed, plead title thereto as against his employer. That which he has been employed and paid to accomplish become, when accomplished, the property of his employer. Whatever rights as an individual he may have had in and to his inventive powers, and that which they are able to accomplish, he has sold in advance to his employer.

It is clear that an employee who is paid to develop an invention comes within the scope of the language cited.

Since Mr. Ruan and Mr. Rutledge were was employed by Lucent, that is, paid compensation to develop passive optical network and optical cross-connect applications, this invention belongs to Lucent and the inventors who contributed to the development of the device have a duty to assign the invention, patent application and any patent which issues thereon to Lucent and upon direction of Lucent execute an application therefor.

Further, a copy of Mr. Ruan's and Mr. Rutledge's signed "Employee Agreement Regarding Intellectual Property" accompanies this petition. This Agreement states that each assigns and agrees to assign to his employer all right, title and interest in and to all inventions made, created, written or conceived by him during his employment. It should be noted that Mr. Ruan's Employee Agreement was signed as Jiayang Ruan, however, in most other correspondence circulated by Mr. Ruan within Lucent, he used only the name "Alex". A copy of another agreement, an "Acknowledgement of Obligations by Terminating Employee", dated 9/13/00, is also enclosed which shows that the same Social Security # and signature is used on both Agreements. This clearly verifies that both Agreements were executed by the same individual.

The inventors, Mr. Ruan and Mr. Rutledge have left the employ of Lucent and have refused to execute the papers required for filing the present application . Lucent is believed to be entitled to make such application on behalf of and as agent for the inventor pursuant to 37 C.F.R. 1.47(b).

The Commissioner is hereby authorized to charge **Deposit Account number 12-2325** to cover the petition fee set forth in 37 C.F.R. 1.17(h) and any additional fees which may be due and owing.

Respectfully submitted,

Date: 8/9/01

By: Matthew J. Hodulik

Matthew J. Hodulik
Attorney for Applicants
Reg. No.: 36,164

Certificate of Mailing

I hereby certify that this correspondence (and any paper referred to as being transmitted therewith) is being deposited with the United States Postal Service with sufficient postage as First Class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on the date indicated below:

AUG. 9, 2001

Sharon Lobosco

SHARON LOBOSCO

LT79-1460
(7/97)

Lucent Technologies
Bell Labs Innovations

EMPLOYEE AGREEMENT REGARDING INTELLECTUAL PROPERTY

In consideration of my employment by Lucent Technologies Inc. or any of its affiliates (hereinafter "Lucent Technologies"), and my continued employment during such time as may be mutually agreeable, and of the opportunity to receive Lucent Technologies private or proprietary information, and other good and valuable consideration:

A. I hereby assign and agree to assign to Lucent Technologies all my right, title and interest in and to all inventions, discoveries, improvements, ideas, mask works, computer or other apparatus programs and related documentation, and other works of authorship (hereinafter each designated "Intellectual Property"), whether or not patentable, copyrightable or subject to other forms of protection, made, created, developed, written or conceived by me during the period of such employment, whether during or outside of regular working hours, either solely or jointly with another, in whole or in part, either:

   1. In the course of such employment, or
   2. Relating to the actual or anticipated business or research or development of Lucent Technologies, or
   3. With the use of Lucent Technologies time, material, private or proprietary information, or facilities.

B. I will, without charge to Lucent Technologies but at its expense, execute a specific assignment of title to Lucent Technologies and do anything else reasonably necessary to enable Lucent Technologies to secure a patent, copyright or other form of protection for said Intellectual Property anywhere in the world.

C. I further agree that I will keep in confidence and will not, except as required in the conduct of Lucent Technologies business or as authorized in writing on behalf of Lucent Technologies, publish, disclose or use, during and after the period of my employment; any private or proprietary information which I may in any way acquire, learn, develop or create by reason of my employment.

D. I further agree that this Agreement does not constitute a contract of employment.

E. I acknowledge that the copyrights in Intellectual Property created within the scope of my employment, belong to Lucent Technologies by operation of law.

Employee Signature	Jiayang Ruan Employee Name (Print)	5/24/99 Date
338-78-0476 Social Security No.	~~OT~~ ONG Lucent Technologies BU	Holmdel Work Location

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Employee Agreements Regarding Intellectual Property should be sent to:

IP-Law Service Room
Room 3J-219
101 Crawfords Corner Road
Holmdel, NJ 07733

09-1496

ACKNOWLEDGMENT OF OBLIGATIONS BY TERMINATING EMPLOYEE 10/2/96

NAME OF EMPLOYEE Alex Ruan SSN 338-78-0476

Title Market Development Man. Function Marketing

Lucent Business Unit ONG Org JJOH20000 Termination Date 9/29/00 (AL)

New Employer Nortel Networks (AL) New Work Address 5405 windward Parkway, Alpharetta GA (AL)

New Home Address Unknown (AL) Date Commence New Employment 10/9/00 (AL)

Area of Responsibility in New Employment mkt mgt. - cable operators - video multi service data (AL)

New Title Mkt Development (AL)

I have been reminded of the following:

(1) My obligation which continues after termination of employment not to publish, disclose, use or authorize anyone else to publish, disclose or use without proper written authorization any private, confidential, or proprietary information that I may have in any way acquired, learned, developed, or created by reason of my employment.

(2) My obligation upon termination of employment to return to supervision all LUCENT property and all documents in my possession or control which contain private, confidential, or proprietary information of LUCENT.

(3) My obligation after termination of employment not to use or disclose without authorization any computer or network access code or password belonging to LUCENT or made available to me by virtue of my employment, and not to access without authorization any computer, network, or data base in the possession or control of LUCENT.

"Private, confidential, or proprietary information" means information which is owned or controlled by LUCENT and has not been publicly released or has not otherwise become common knowledge in its field of interest. It includes information of third parties in the possession of LUCENT which LUCENT is obligated to maintain in confidence. Examples of such information include: (a) discoveries, inventions, and developments, including knowledge of unsuccessful approaches; (b) scientific/engineering information, including information contained in patent applications, e.g., research, processes, designs of apparatus and equipment, engineering aids, manuals, and computer architecture, logic, and software (i.e. any nontrivial, executable routine, whether in source or object code) (c) technical management information, e.g., proposals, schedules and performance objectives and criteria, and analyses of areas for development; (d) financial information, e.g., product and service cost data, revenue and profit margins; (e) business, marketing, legal, and regulatory information, e.g., project proposals, financial data, marketing studies, construction plans, contemplated new ventures, customer information, unannounced future products and strategies, existing and planned LUCENT and customer network configuration and design, and billing information; (f) personnel information, e.g., salaries, job assignments and skills, and merit reviews.

Such information may be in intangible form such as unrecorded knowledge, ideas, or conceptions, or may be embodied in equipment or other tangible form such as written memoranda, drawings, training materials, specifications, notebook entries, photographs, graphic representations, firmware, computer information or software. Such information does not include the employee's general knowledge, skill, and experience.

I have written below (or on the reverse side of this form) a general description of (1) the private, confidential, or proprietary information relating to my job function at LUCENT (see above), and (2) intellectual property to which I have contributed, including works of authorship and inventions, not yet reported to the LUCENT's intellectual property attorneys:

IF REVERSE SIDE OF FORM IS ALSO USED, CHECK HERE ___

SIGNATURE OF EMPLOYEE _____ DATE 9/13/00

NAME OF INTERVIEWER OR WITNESS G S Rosen

UPON COMPLETION PLEASE FORWARD THIS FORM TO: LUCENT LAW DIVISION, ATTN: ACKNOWLEDGMENTS, SUITE 2000, 150 ALLEN ROAD, LIBERTY CORNER, NEW JERSEY 07938

September 13, 2000

Alex Ruan's Knowledge of Lucent Information on ONG/Cable TV Market Space

1. Detailed knowledge of ONG products: architecture, features & functionalities, network applications, pricing, cost, related services (installation, engineering, etc...), factory loading & ordering process.
2. Knowledge of ONG business processes (CMP, SIPP, etc...)
3. Knowledge of Lucent activities to address the Cable market space, including product gap analysis and M&A options (this was a result of his involvement on a SWAT Team working on Cable opportunities)
4. Knowledge of the Dynamic PON concept, a technical concept to make efficient use of the cable frequency spectrum to maximize the bandwidth reuse in the cable plant to better serve cable customers while minimizing network investment. This concept has been shared with Lucent Patent attorney (Matthew Hodulik) and is being pursued as a patent application. Alex also has knowledge of possible technical solutions to implement the Dynamic PON concept such as the MEMS technology in Lambda Router.
5. Knowledge of Lucent activities to address the AT&T Global and Local market.

Lucent Technologies
Bell Labs Innovations

LT79-1460
(7/97)

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A. I hereby assign and agree to assign to Lucent Technologies all my right, title and interest in and to all inventions, discoveries, improvements, ideas, mask works, computer or other apparatus programs and related documentation, and other works of authorship (hereinafter each designated "Intellectual Property"), whether or not patentable, copyrightable or subject to other forms of protection, made, created, developed, written or conceived by me during the period of such employment, whether during or outside of regular working hours, either solely or jointly with another, in whole or in part, either:

   1. In the course of such employment, or
   2. Relating to the actual or anticipated business or research or development of Lucent Technologies, or
   3. With the use of Lucent Technologies time, material, private or proprietary information, or facilities.

B. I will, without charge to Lucent Technologies but at its expense, execute a specific assignment of title to Lucent Technologies and do anything else reasonably necessary to enable Lucent Technologies to secure a patent, copyright or other form of protection for said Intellectual Property anywhere in the world.

C. I further agree that I will keep in confidence and will not, except as required in the conduct of Lucent Technologies business or as authorized in writing on behalf of Lucent Technologies, publish, disclose or use, during and after the period of my employment; any private or proprietary information which I may in any way acquire, learn, develop or create by reason of my employment.

D. I further agree that this Agreement does not constitute a contract of employment.

E. I acknowledge that the copyrights in Intellectual Property created within the scope of my employment belong to Lucent Technologies by operation of law.

10-7551

Employee Signature	Christopher L. Rutledge	5-11-1998
	Employee Name (Print)	Date

454-29-7812	Optical NetworKing	101 Crawfords Corner, Holmdel, NJ
Social Security No.	Lucent Technologies BU	Work Location

For Lucent Technologies Use Only

Employee Agreements Regarding Intellectual Property should be sent to:

IP-Law Service Room
Room 3J-219
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Filing Date:	**March 29,2001**	:	
Title:	**Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect Architecture and Dense Wavelength Division Multiplexing**	:	Group Art Unit: **TO BE ASSIGNED**

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION AND VERIFIED STATEMENT

I, Matthew J. Hodulik, having personal knowledge of the facts set forth herein, hereby declare and say that:

1. I am an attorney with the Lucent Technologies, Inc. in Holmdel, New Jersey, for the rightful Assignee of the above referenced case, Lucent Technologies, Inc.

2. On September 9, 1999, the Holmdel office received a patent disclosure for the instant application from C.L. Rutledge and A. Ruan with a request to file a patent application on the subject matter therein. An initial meeting was held with the inventors to discuss the merits of the invention.

A copy of the September 9, 1999 communication is enclosed herewith. (Exhibit A)

3. Additional documentation regarding the invention, entitled Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect Architecture and Dense Wavelength Division Multiplexing was received from the inventors in February of 2000. The additional disclosure documentation is signed and dated February 7, 2000. (Exhibit B)

Copies of the above referenced documentation are enclosed herewith.

4. A provisional patent application, Serial No. 60/235892 for the subject matter included in the disclosures referenced in paragraphs 3 and 4 above was filed on October 3, 2000.

5. Subsequent to filing the provisional patent application, the corresponding subject matter was converted to a non-provisional application. Copies of the draft application were forwarded to each of the inventors at their residences via overnight mail on December 7, 2000. See enclosed records. (Exhibit C)

6. Attempts by phone, where messages were left, and a subsequent mailing to Mr. Rutledge on March 6, 2001 did not result in any response by either of the inventors. Various email messages to Mr. Rutledge are also attached. (Exhibit D)

7. The instant non-provisional patent application was filed on March 29, 2001.

8. A final attempt to contact the inventors and gain the proper signatures was made on April 26, 2001, to which neither of the inventors responded. See enclosed correspondence. (Exhibit E)

12. I hereby verify that all copies of documents in support of this Declaration are true copies.

13. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

Code, and that such willful false statements may jeopardize the validity of the application, any patent issued thereon, or any patent to which this verified statement is directed.

Date: 8/9/01 By: Matthew J. Hodulik

Matthew J. Hodulik
Attorney for Applicant
Reg. No.: 36,164

Certificate of Mailing

I hereby certify that this correspondence (and any paper referred to as being transmitted therewith) is being deposited with the United States Postal Service with sufficient postage as First Class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on the date indicated below:

AUG. 9, 2001 Sharon Lobosco

Sharon Lobosco

EXHIBIT A

Lucent Technologies
Bell Labs Innovations

subject: **Distributed Optical Cross Connect**

date: **September 9, 1999**

from: **C. L. Rutledge**
ONG – Market Development
HO 3L-505
732-332-6078

A. Ruan
ONG – Market Development
HO 3L-314
732-949-1836

Purpose

The purpose of this document is to provide a solution that Lucent's Optical Networking Group could apply to the present AT&T LightWire platform in the form of an offer suite. This option falls closer to Phase II (and beyond) of the LightWire platform.

Background

AT&T has committed to deal with the last mile and access charge issues via the CATV network. AT&T has made clear in public their plans to employ the AT&T Labs LightWire platform as a means of extending and future proofing their broadband network. There are already a number of vendors who have been selected to participate in AT&T's trials based on their adherence to and/or their product portfolio fit in the LightWire specification. LightWire helps to lower operating costs, future proof and improve the network reliability and performance of the HFC network.

The Optical Networking Group should play a part in the build out of this edge network, as that play would obviate even more value in ONG's present and future AT&T 'core' network offerings. This is an opportunity to sequentially offer complementary and compatible solutions all the way to the end user.

Since the emphasis of the CATV business is evolving from (1) broadcasting to targeting and (2) channels supported to services supported, an attractive offer would have the characteristic of delivering ***any*** service directly to a user (or user cluster) during a subscription period. Such a network would also lend itself as a transport of non-native traffic (e.g. cellular/pcs/DSLAM backhaul, leased service…). The latter characteristic would permit the 'knitting together' of AT&T's disparate networks (i.e. core, ALS, AWS, BIS, data).

Proposal

Lucent Technologies should offer a solution that fits into, while enhancing, the LightWire platform. This offer must have the capability to segment the AT&T-BIS network such that targeted services can be managed in the most effective way possible. Optical cross-connect technology (MEMS-based at present) will be employed from the primary hub to the mini-Fiber node creating a distributed Optical Cross-Connect (with broad-/multi-/narrowcast capability). An analog DWDM transport system will also be needed in the intermediate term for legacy support. Per the LightWire topology, this CATV-OxC function will be across the Primary Hub, the Secondary Hub and the MuxNode. The initial depth and deployment of the technology will depend on take rate of high bandwidth services. Ergo, there would be no need to deploy or support an entire distributed OxC if there are no takers for high-end services.

The goal of this architecture is to support a flexible PON. AT&T has expressed their desire on a number of fronts to deliver up to a wavelength's worth of "baseband" digital information from the core to the edge. It

is highly impractical to design a system that could assign a wavelength to each of 20,000 users being served by a secondary hub. Therefore a PON based structure is in order. The variable PON concept allows a maximized PON to perform beyond its static limitation by employing DWDM and wavelength routing. As a PON is a shared access method, the maximum amount of traffic that each user receives is determined by the usage of others on the PON. By delivering a number of wavelengths to the PON and using said wavelengths to support a subset of users on the PON would allow the static PON to exceed its maximum capability. The aforementioned optical cross-connect will be pivotal in this function. Placed on the primary ring, it will have the ability to target wavelengths to any subset of secondary hubs. Likewise, secondary hub and tertiary MuxNode placement will enable targeted communications to select mFNs.

This topology could be configured as a self-healing, redundant architecture. The initial port-count requirements of the MEMS-based OxC are also much lower than is needed for telecommunications applications. Early estimations are that port requirements of < 100x100 would suffice in this application. (For example: a secondary hub serving 20,000 homes and being fed by an 80λ OLS system would require an 80x16 OxC at the hub and an 80x24 OxC at the MuxNode.) Due to the nature of the OxC, a customer's optical path could have the capabilities of a dedicated fiber as the OxC is managing optical paths and not wavelengths. The 'Headend Box' will still be needed as a bridge between the analog world and OLS transport equipment.

Strategies Toward Customer Buy-In

One of the most difficult aspects of this idea is conveying a cohesive and attractive story to the AT&T customer. After discussing this with the customer they should understand:

1. This idea jibes with the LightWire concept.
2. They will have a clear option to hook business customers and large data users directly to the core network via a malleable metro infrastructure.
3. As this architecture evolves into "true" FTTH, it will be capable of supporting APON, broadcast, multicast (i.e. selected broadcast), and narrowcast. This characteristic enables VPN support.
4. This architecture, with multiple points of entry and exit, allows the transport of ALS, AWS, BIS and core traffic through the HFC network.
5. AT&T must understand that this is a "deploy/pay as customer demand grows" option.

Issues to address/resolve

- Session Management Software will have to be developed to track each state of the Distributed OxC for return path mapping, OAM&P and billing.
- As each optical path that the Distributed OxC sets up for a customer could support numerous channels, optical channel tracking will have to be solved for both digital (Wrappers?) and analog signals. The OxC technology employed in this idea is not a barrier of entry.
- Low port count MEMS-based OxC hardware could be available within a year. Prior to developing such a device a few issues will have to be modeled.
    a. How practical is an OxC with multicast and broadcast capability? Can it be done in an optical fabric?
    b. An OxC that has multi-cast functionality could have wavelengths exiting, for example, 16 output ports that vary in power by at least 12dB. The integrity of all signals (digital and analog) cannot be compromised as a result of OxC implementation. Equalization issues must be addressed.
- Determine the most efficacious architecture employing this OxC without transmogrifying present architectures.

Trends in the Industry

Service providers are upgrading fiber and coax plant. Node sizes are decreasing as fiber penetration is increasing. More analog and digital DWDM systems are being targeted for deployment.

Recently AT&T-BIS has signaled a commitment in Scientific-Atlanta's digital baseband reverse (dbr) technology that should be available within a year. This technology establishes upstream baseband digital traffic deep in the HFC network. The S-A dbr technology is of importance because

- AT&T has committed to it,
- It is totally in line with Phase II of LightWire,
- S-A has teamed with Bookham Technology to incorporate integrated optical demux/detectors in what could be the new mini-Fiber Node and
- Others are deploying similar technologies (S-A in on track to be second to the market).
- Reverse path DWDM systems become the more 'traditional digital' variety

Benefit to Lucent Technologies

The full upgrade of AT&T's HFC infrastructure will not come all at once. Also, it is hard to imagine AT&T upgrading their core and edge networks simultaneously for both financial and logistical reasons. Given that, each time the edge network is upgraded there will be limits to the extent core is upgraded. As the performance of the edge network increases the need for more core performance will subsequently increase. Lucent could wait until the new edge build-out burdens AT&T's core network to the extent that AT&T requires higher capacity core systems. If this strategy is taken, then there is a great risk that those edge network builders will have a "story" describing their own core network solution. Lucent should take this opportunity to walk in 'lock step' with AT&T as they build out their entire broadband network.

C. L. Rutledge

A. Ruan

EXHIBIT B

Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect Architecture and Dense Wavelength Division Multipexing

CHRISTOPHER L. RUTLEDGE
Optical Networking Group - Market Development
(732) 332-6078

ALEX RUAN
Optical Networking Group - Market Development
(732) 949-1836

The purpose of this email is to describe how the Dynamic PON idea is realized. The fundamental hardware configuration will be described as well as the function of the OxC's software.

M Optical signals enter the 'box' and exit through N output ports. Each of the M signals can be delivered to none, some or all of the N output ports. *If employing WDM*, the signals will enter the 'box' on one fiber. At the entry of the box, a 1:N power splitter is encountered. Each of the N power splitter outputs contains all M channels. Each of the aforementioned outputs will be fed into an optical demultiplexer where each of the M optical signals will appear on an output fiber of the demultiplexer. All outputs of the demultiplexer are terminated on (at least) an MxM cross connect. The output ports of the MxM cross connects are connected to N optical multiplexers. They are connected by grouping the output ports in M/N groups and connecting the first of those groups to the first optical multiplexer, the 2nd group to the 2nd optical multiplexer, and so forth. In the end, each optical cross connect will have connectivity to all of the multiplexers via M/N ports connected to each of the N optical multiplexers. (note: to support the fore mentioned embodiment, N MxM cross connects will be needed. this makes for a very modular design (key value proposition because in the initial phases of deployment there will be a limited number of wavelengths and a limited deployment depth.). However the N MxM cross connects could be replaced by an (N)Mx(N)M cross connect with straight forward connections to the optical multiplexers.)

If not employing DWDM, each of the M incoming optical wavelengths will have to be split N times by a power splitter. The optical demultiplexing function is not needed. The outputs of all of the power splitters will be connected to the cross connect fabric and multiplexers as described above.

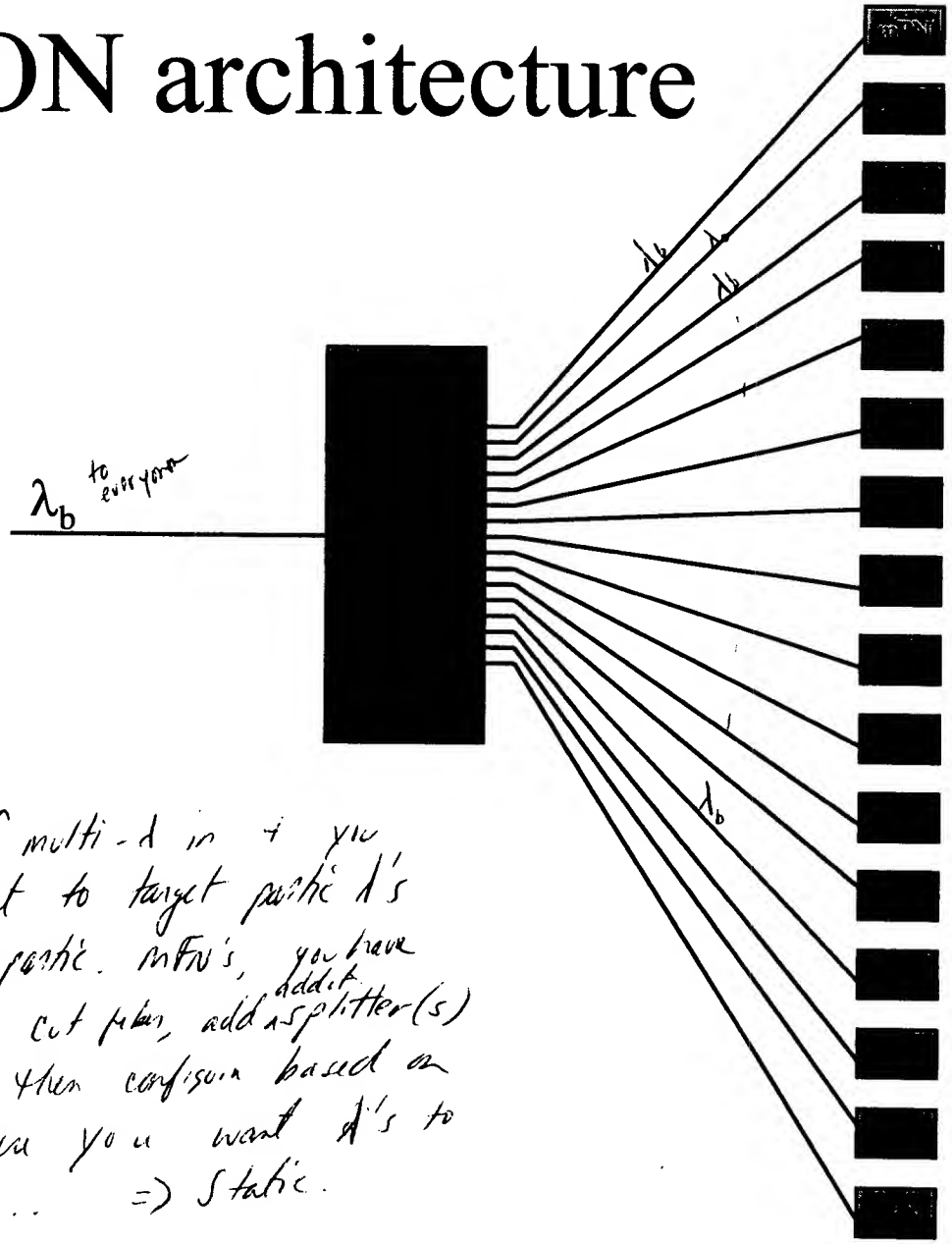
In the local channel insertion embodiment, another cross connect will have to be knitted into the fabric such that it could 'contact' the optical multiplexers along with the rest of the 'through' traffic. In this case, local wavelengths could in fact be the same as the through wavelengths but software control will have to prohibit the connection of those identical wavelengths (carrying different traffic) to the same port.

The enabling software must be capable of managing a single or pieced cross connect fabric. Therefore, the software will permit the pay as you grow opportunity by tiling cross connects together to work as one unit and by total management of traffic. The software will also permit the local channel insertion option described above. This software will manage the configuration of concatenated fabrics (e.g. from the master headend to the mini-fiber node). It is the function of the software to remember the configurations of each individual cross connect and the fabric as a whole. This will allow for proper provisioning and maintenance of the network. And as subscribers move on and off of the PON that the fabric establishes, the software will allow for the proper billing per session. As each cross connect passes configuration information to the lower level fabrics, the reverse (upstream) path will also be set accordingly.

In a configuration in which multiple wavelengths are being sent in the downstream, it would soon become unruly if multi-wavelength upstream traffic were not supported. The upstream path could be supported with the similar (or shared) fabric as the downstream.

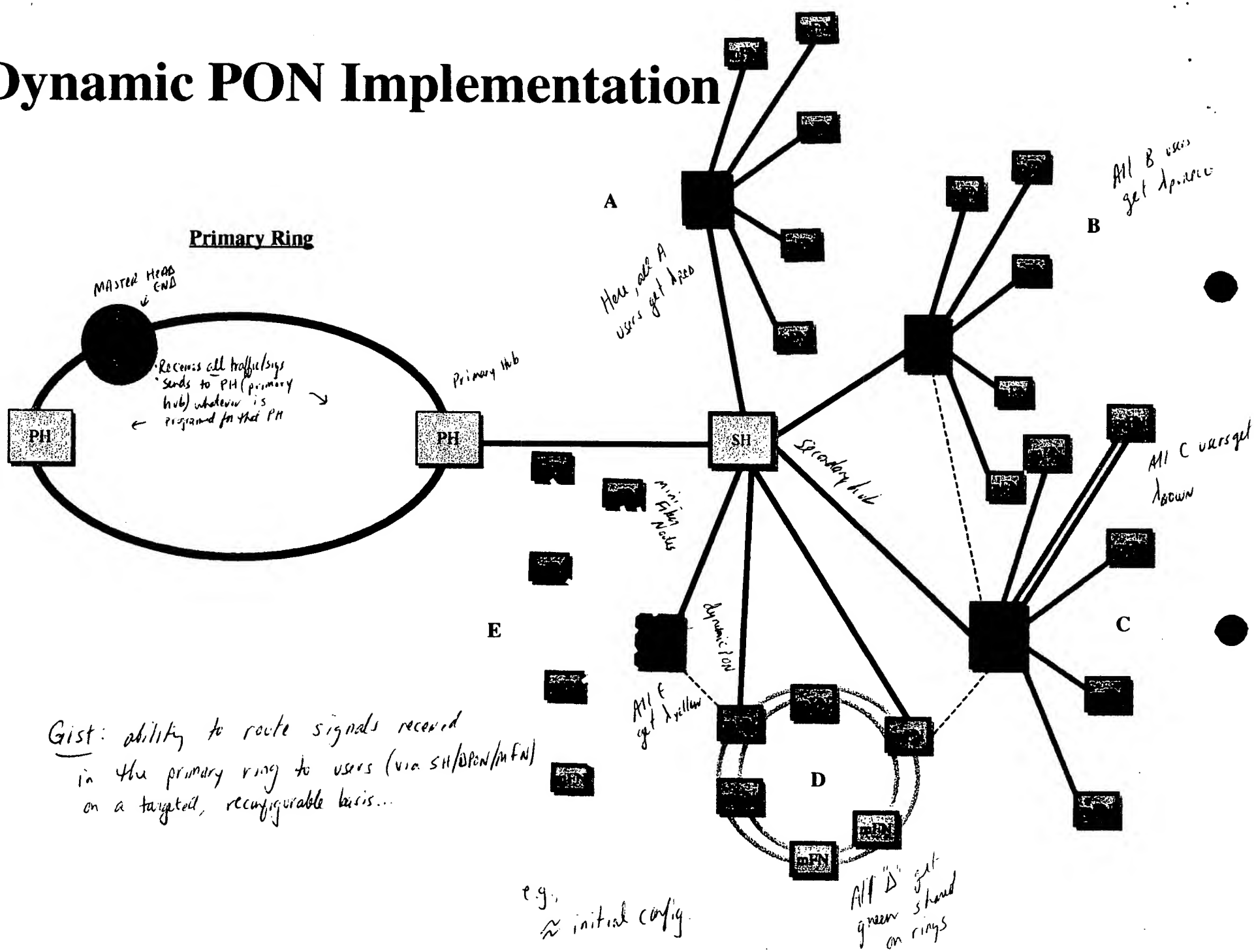
PRIOR ART.

Basic PON architecture



If multi-λ in ↑ you want to target particular λ's to particular ONU's, you have to cut fiber, add splitter(s) & then configure based on when you want λ's to go.. => Static.

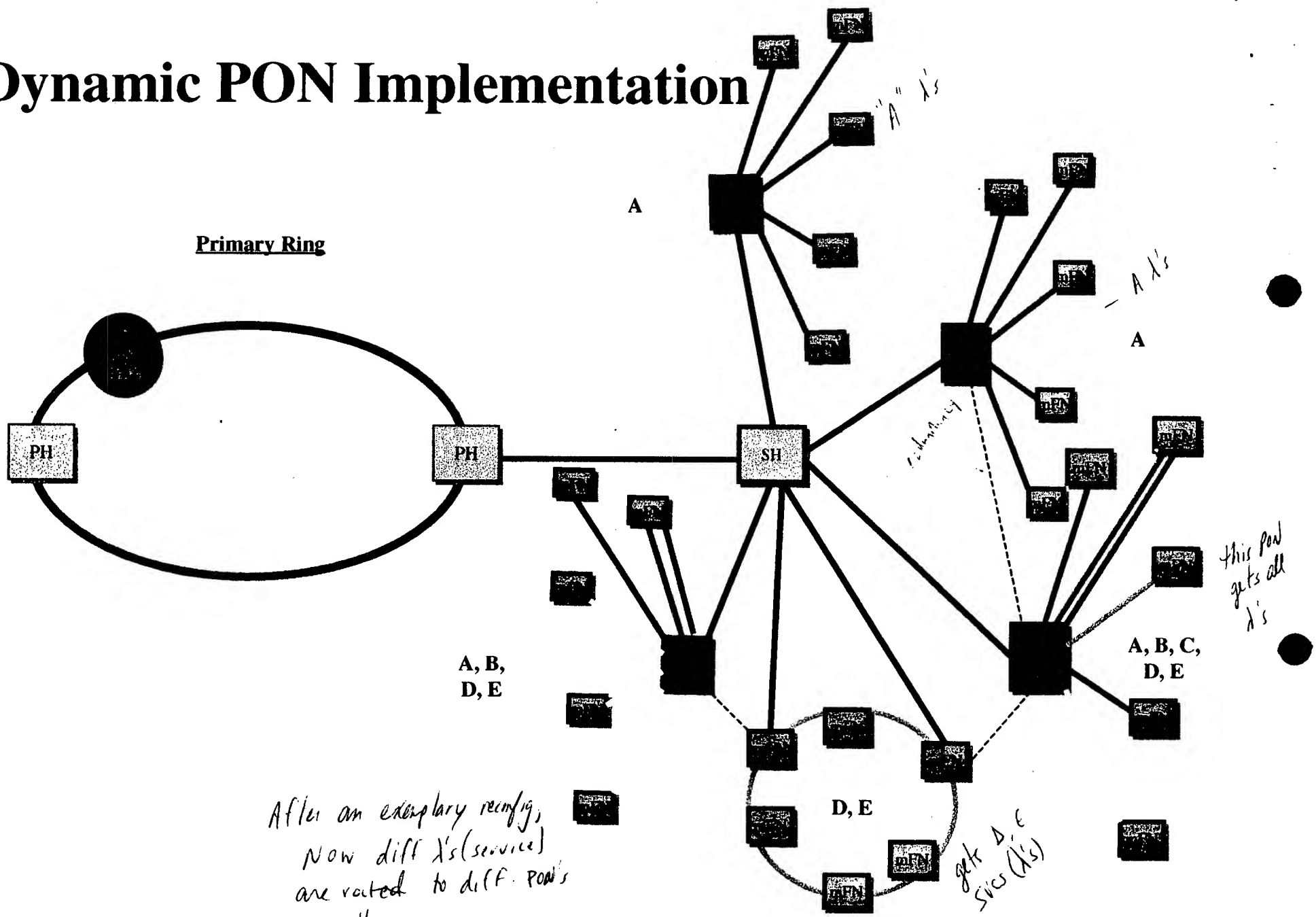
Dynamic PON Implementation



Gist: ability to route signals received in the primary ring to users (via SH/DPON/mPN) on a targeted, reconfigurable basis...

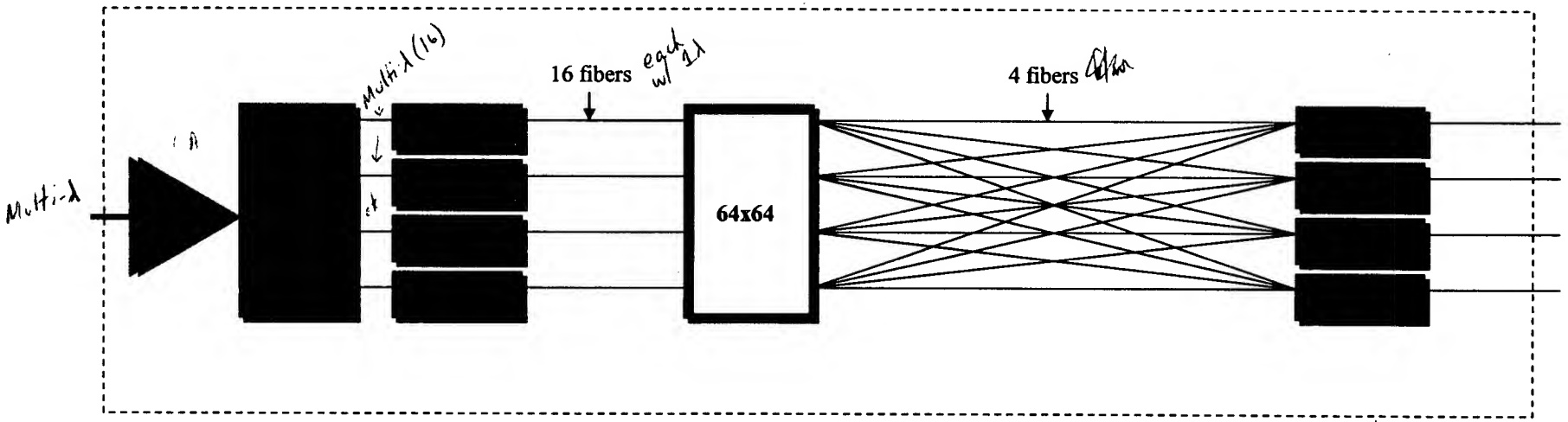
e.g.
≈ initial config

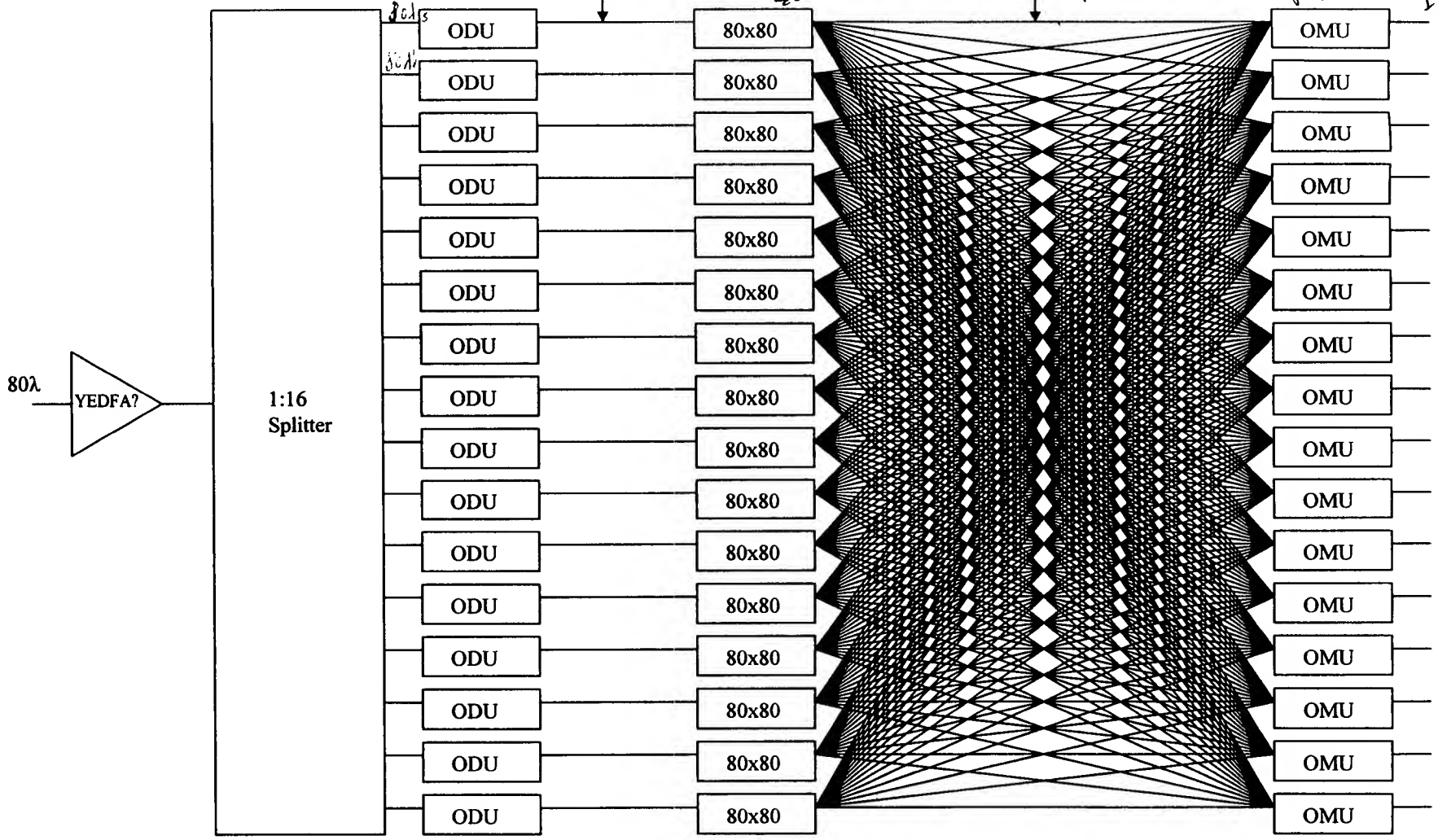
Dynamic PON Implementation



SMALLER SCALE
EXAMPLE (16 x 4)

Smaller scale ex 16λ x 4





80x16 OxC

- Broadcast and multicast
- Output power disparities minimized

Lucent Technologies
Bell Labs Innovations

Authorization For Mailing/Shipping Services

Date: 12/7/00

LT333-PRO (8/99)

From:

Name Matthew J. Hodulik HRID 9196367

Room # 3K-223 Phone # 9-9742

Street Address 101 Crawfords Corner Rd

City Holmdel State NJ Zip 07737

Billing Information:

Customer Carrier Acct. #

Carrier Name Cost Center Code 10010440

Service Requested:

- ___Next Business Day (Morning)
- ___Next Business Day (Afternoon)
- ___Second Business Day
- ___Same Day/Messenger Service
- ___International (Additional information required)
- ___Chemical Substance/Hazardous Material
- ___Saturday Delivery
- ✓ Certified/Registered Mail
- ___Postage
- ___UPS/RPS Ground
- ___Other
- ___Insurance $

Description of item(s) Comments and/or Serial Numbers (required for international) (See page 2 for larger Shipments)	Qty	Unit Value
Ruan 1-1 appl.		

Expenditure Approval Management Signature: Lourdes Chesal

Name (Print Or Type): Lourdes Chesal

Lucent Technologies
Bell Labs Innovations

To:

Int: Rm. #

Company

Name Alex Ruan

Room/Floor/Suite Number 302 Harvard Place

Street Address Morganville NJ

City/State/Zip Code 07751

Telephone Number ( )

Please attach label here

EXHIBIT C

Mail/Shipping Use Only

Weight of Shipment(s)	Cost $	Tracking No.

Comments:

Driver Signature:	Date:	Time:
P.O.D.:	Date:	Time:

VIA PRIORITY MAIL

December 7, 2000

Alex Ruan
302 Harvard Place
Morganville, New Jersey 07751

Dear Alex:

Re: Patent Application for "Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect and Dense Wavelength Division Multiplexing"

Enclosed for your review is a draft patent application which will be filed in the United States Patent Office in the near future. As you may be aware, you have been recognized as a co-inventor for the invention described in this application based on your contributions while you were employed at Lucent. We ask that you review the application and execute and return the enclosed formal documents so that the application may be promptly filed in the United States Patent Office. During you review, please pay special attention to the comments/inquiries in bold type as they may require some input or comment.

Once you have reviewed the application, please forward any comments to my attention, (e.g., via a marked-up copy) at your earliest convenience. We plan to file the application as soon as possible and request that you return the executed documents to our office by **December 22, 2000**. Enclosed is an addressed, pre-paid envelope for your use in returning the documents. Before signing the documents, please note that the "Assignment and Agreement" must be signed in the presence of a Notary Public.

Please also be advised that the subject matter of the patent application is proprietary to Lucent Technologies Inc. and should be treated accordingly and not discussed with anyone outside of Lucent Technologies Inc.

If you have any questions, please do not hesitate to contact me. Should you incur any reasonable expenses in connection with the execution and delivery of the documents, please send me copies of any receipts, fees, etc., and Lucent Technologies Inc. will reimburse you.

I appreciate your cooperation in this matter and congratulations on your patent application.

Very truly yours,

Matthew J. Hodulik
Corporate Counsel

Atts.
As above

Lucent Technologies
Bell Labs Innovations

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Name Matthew J Hodulik HRID 9196367

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Ruan 1-1 application		

Expenditure Approval Management Signature: [signature]

Name (Print Or Type): Lourdes Chesal

Lucent Technologies
Bell Labs Innovations

To:

Int: Rm. #

Company

Name Christopher L. Rutledge

Room/Floor/Suite Number 39 Suydam Rd

Street Address Somerset NJ

City/State/Zip Code 08873

Telephone Number ( )

Please attach label here

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Weight of Shipment(s)	Cost $	Tracking No.

Comments:

Driver Signature:	Date:	Time:
P.O.D.:	Date:	Time:

VIA PRIORITY MAIL

December 7, 2000

Christopher L. Rutledge
39 Suydam Road
Somerset, New Jersey 08873

Dear Chris:

Re: Patent Application for "Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect and Dense Wavelength Division Multiplexing"

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Very truly yours,

Matthew J. Hodulik
Corporate Counsel

Atts.
As above

EXHIBIT D

Hodulik, Matthew J (Matthew)

From: Hodulik, Matthew J (Matthew)
Sent: Wednesday, June 07, 2000 4:03 PM
To: Rutledge, Christopher L (Chris); Ruan, Alex (Alex)
Cc: Murgia, Gregory J (Gregg)
Subject: Dynamic PON patent app.

Chris and Alex,

As per my voice message to Chris, I'll be handling the preparation of the dynamic PON patent application for Greg Murgia. Just wanted to know if there are any recent updates to the invention disclosure that I should know about. Also, are either of you available for a quick discussion/meeting in the near future in order to solidify my understanding before writing? Thanks. Matt

Matthew J. Hodulik
Corporate Counsel
Intellectual Property Law
☎ Tel. (732) 949-9742
☎ Fax (732) 949-7290

O Lucent Technologies Inc.
Room 3K-223
101 Crawfords Corner Rd.
Holmdel, NJ 07733
✉ hodulik@lucent.com

Hodulik, Matthew J (Matthew)
From: Hodulik, Matthew J (Matthew)
Sent: Thursday, October 12, 2000 10:56 AM
To: Rutledge, Christopher L (Chris)
Subject: RE: how are we lookin'

Chris,

We filed a provisional application about two weeks ago (to reserve the date) based on the information that was provided to date by you. I hope to convert this to a "regular" application within the next 3 weeks or so – at which time you'll have something to review. I'm glad you're on this. You'll hear from me soon. Regards, Matt.

From: Rutledge, Christopher L (Chris)
Sent: Thursday, October 12, 2000 10:25 AM
To: Hodulik, Matthew J (Matthew)
Subject: how are we lookin'

Matt,
Is the DPON submitted at this juncture?

CHRISTOPHER L. RUTLEDGE
Optical Networking Group - Market Development
(732) 332-6078
(732) 332-5297 fax
crutledge@lucent.com

Hodulik, Matthew J (Matthew)

From: Hodulik, Matthew J (Matthew)
Sent: Tuesday, March 06, 2001 4:20 PM
To: 'rrrut@yahoo.com'
Subject: Patent Application

Chris,

Attached is an electronic copy of the patent application for your review. The drawings were done by hand, so they have been sent to your home by mail along with a hard copy of all the documents.

Also would you happen to have a forwarding address or phone number for Alex Ruan so that I can send him the same documents. I had sent them to his previous address and am not sure whether they were ever forwarded. If you wish you could forward the electronic copy to him.

Thanks in advance for your cooperation.

Matt

Matthew J. Hodulik
Corporate Counsel
Intellectual Property Law
☎ Tel. (732) 949-9742
☎ Fax (732) 949-7290

O Lucent Technologies Inc.
Room 3K-223
101 Crawfords Corner Rd.
Holmdel, NJ 07733
✉ hodulik@lucent.com

Ruan 1-1.doc

Hodulik, Matthew J (Matthew)

From: Hodulik, Matthew J (Matthew)
Sent: Monday, March 12, 2001 6:59 PM
To: 'rrrut@yahoo.com'
Subject: Patent Application

Chris,
I just wanted to confirm that you received my previous email and the hard copy of the patent application. I need your comments by March 23rd, otherwise, I am going to file the patent substantially as is.

Please give me a call or let me know if you intend to send comments. I could also meet you for lunch to wrap things up quickly.

Regards,
Matt

Matthew J. Hodulik O Lucent Technologies Inc.
Corporate Counsel Room 3K-223
Intellectual Property Law 101 Crawfords Corner Rd.
☎ Tel. (732) 949-9742 Holmdel, NJ 07733
☎ Fax (732) 949-7290 ✉ hodulik@lucent.com

Hodulik, Matthew J (Matthew)
From: Hodulik, Matthew J (Matthew)
Sent: Monday, March 26, 2001 11:22 AM
To: 'rrrut@yahoo.com'
Subject: FW: Patent Application

Chris,

How about a quick call, just to wrap up. V. Vu said you were on board.

Matt

From: Hodulik, Matthew J (Matthew)
Sent: Monday, March 12, 2001 6:59 PM
To: 'rrrut@yahoo.com'
Subject: Patent Application

Chris,
I just wanted to confirm that you received my previous email and the hard copy of the patent application. I need your comments by March 23rd, otherwise, I am going to file the patent substantially as is.

Please give me a call or let me know if you intend to send comments. I could also meet you for lunch to wrap things up quickly.

Regards,
Matt

Matthew J. Hodulik O Lucent Technologies Inc.
Corporate Counsel Room 3K-223
Intellectual Property Law 101 Crawfords Corner Rd.
☎ ***Tel. (732) 949-9742 Holmdel, NJ 07733***
☎ ***Fax (732) 949-7290*** ✉ hodulik@lucent.com

EXHIBIT E

Lucent Technologies
Bell Labs Innovations

Matthew J. Hodulik
Corporate Counsel
Intellectual Property - Law

101 Crawfords Corner Road
Room 3K-223
Holmdel, NJ 07733 USA

Phone 732 949 9284
Fax 732 949 0292
mhodulik@lucent.com

Via Overnight Mail

April 26, 2001

Alex Ruan
5330 Lexington Woods Lane
Alpharetta, GA 30005

Dear Alex.

Re: Ruan 1-1 Patent Application, "Dynamic Passive Optical Network (PON) Using a Distributed Optical Cross-Connect Architecture and Dense Wavelength Division Multiplexing"

The U.S. Patent Office has confirmed receipt of the patent application referenced above on which you are listed as a co-inventor. Attached are two sets of documents that need to be signed at this time. You need to sign both these documents, **in blue ink**, exactly as your name is typed, on the two places we have indicated with tabs. Before signing, however, please note that the Assignment and Agreement must be signed in the presence of a notary public. These documents are due in the patent office by **May 30, 2001**. Please return the signed documents as soon as possible. We have enclosed a pre-paid return express-mail envelope for your use. Should you incur any expenses relative to these documents, such as notarial fees, etc., please send us a receipt and we will be glad to reimburse you.

We appreciate your continued assistance with this application and look forward to its issuance by the Patent Office.

If you have any questions or need assistance, please call me or my legal assistant, Lourdes Chesal, at (732) 949-9284.

Yours very truly,

Matthew J. Hodulik, Esq.
Intellectual Property - Law

Enclosures

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FROM: (PLEASE PRINT) PHONE ( )

Matthew J. Hodulik
Lucent Technologies Inc.
101 Crawfords Corner Rd., RM. 3K-233
Holmdel, NJ 07733-2030

Doc 5 Assignment - Ruan I-1

TO: (PLEASE PRINT) PHONE ( )

Alex Ruan
5330 Lexington Woods Lane
Alpharetta, GA 30005

FOR PICKUP OR TRACKING CALL 1-800-222-1811 **www.usps.gov** EMS

Label 11-B July 1997

Lucent Technologies
Bell Labs Innovations

Matthew J. Hodulik
Corporate Counsel
Intellectual Property Division

101 Crawfords Corner Road
Room 3K-223
Holmdel, NJ 07733 USA

Phone 732 949 9742
Fax 732 949 0292
mjhodulik@lucent.com

Via Overnight Mail

April 26, 2001

Christopher L. Rutledge
39 Suydam Rd.
Somerset, NJ 08873

Dear Christopher.

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If you have any questions or need assistance, please call me or my legal assistant, Lourdes Chesal, at (732) 949-9284.

Yours very truly,

Matthew J. Hodulik, Esq.
Intellectual Property - Law

Enclosures

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NO DELIVERY ☐ Weekend ☐ Holiday

Customer Signature

FROM: (PLEASE PRINT) PHONE ( )

Matthew J. Rodulik, Esq.
Vacuum Technologies Inc.
101 Crawfords Corner Rd., Rm. 3F-333
Holmdel, NJ 07733-3030

DTC A ADRIAN - Wm 1-1

TO: (PLEASE PRINT) PHONE ( )

Christopher L. Rutledge
38 Sweden Rd.
Somerset, NJ 08873

FOR PICKUP OR TRACKING CALL 1-800-222-1811 **www.usps.gov** EMS

Label 11-B July 1997